PIERCING DEVICE WITH ROTARY ELEMENT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a U.S. National Stage Application under 35 U.S.C. §371 of International Application No. PCT/EP2012/054519, filed Mar. 15, 2012, which claims the benefit of and priority to German Application No. 10 2011 015 758.1, filed on Mar. 31, 2011, each of which is hereby incorporated by reference in its entirety.

DESCRIPTION

The invention relates to a piercing device for taking blood for medical analyses, comprising a base body, comprising at least one needle which is arranged therein and has a tip which can be extended, comprising a needle holding element which encloses the needle at least in part and a drive unit for driving a movement of the needle together with the needle holding element with respect to the base body.

Piercing devices of this type are known in various respects. For example, there are piercing devices which by means of a drive unit comprise a plunger-like element, having a spring connected thereto in a wide range of forms such as a spiral spring or a leg spring, and a needle holding element which is driven by this plunger. As a result, the needle or respectively lancet is slid forwards and exits the piercing device or respectively base body so as to pierce the skin of a patient.

If it is desired for the lancet or respectively needle to be retracted immediately after the piercing process and disappear into the base body or respectively housing of the piercing device, in piercing devices of this type there are a wide range of types of curved path which, as a result of the curved extension, initially make it possible for the needle holding element, which is equipped for example with a projection which extends within a curved path of this type, initially to exit the base body forwards and subsequently be retracted back into the body, since at this point the curved path is formed extending backwards or respectively rearwards again.

Piercing devices of this type generally have the drawback that they experience an additional movement of the needle or respectively needle element when the piercing device is biased again, after a piercing process has previously been carried out and before a further piercing process is triggered. The resulting movement of the lancet or respectively needle is generally undesired, since it requires high complexity of components operating inside one another, a large constructional space, high manufacturing costs and the movement of a large number of components during the tensioning process.

Accordingly, the object of the invention is to provide a piercing device for taking blood for medical analysis, comprising a base body, a needle, a needle holding element and a drive unit, in which a biasing process for a new piercing sequence or respectively piercing process can take place without simultaneous movement of the needle.

This object is achieved in accordance with the features of claim **1**.

An essential aspect of the invention is that in a piercing device for taking blood for medical analyses, comprising a base body, comprising at least one needle which is arranged therein and has a tip which can be extended, comprising a needle holding element which encloses the needle at least in part and a drive unit for driving a movement of the needle together with the needle holding element with respect to the base body, a rotary element is arranged, which is provided between the drive unit and the needle holding element as a connection element for carrying out a rotary movement, and the rotary movement, both to the left and to the right, respectively brings about the movement of the needle holding element both forwards and backwards.

In other words, irrespective of whether the rotary element rotates to the left or rotates to the right, that is to say clockwise or anticlockwise, the arrangement of a rotary element of this type can bring about both a forward and a backward movement of the needle holding element during a rotary movement of this type in only one direction.

The drive element can be moved linearly and is equipped with at least two engagement arms, a respective one of the engagement arms engaging in one of at least two projections on the rotary element, and the other projection being deflectable by means of a curved path on the other engagement arm without taking on an engagement position with the other engagement arm, during each rotary movement. This makes it possible for either one engagement arm or the other engagement arm to engage in one of the projections, alternating as a function of the direction of rotation of the rotary movement, but without the further engagement arm engaging in the remaining projection at the same time. This makes it possible for the rotary element to rotate back and forth for the different piercing processes. In this context, it is important that the first projection and the first engagement arm, as seen in the piercing direction, are arranged to the left of a longitudinal axis which extends through an axis of rotation of the rotary element, and the second projection and second engagement arm are arranged to the right of the longitudinal axis. In this way, a rotary movement of the projection, which at this time is engaged in the engagement arm, from left to right or from right to left along the longitudinal axis, and thus also a forward and backward displacement of the needle holding element which is likewise connected to the rotary element, can always be brought about.

A kind of curved path is thus described by the rotary movement of the rotary element, and at the same time the arrangement of an engagement arm and the two projections on the rotary element ensures that the lancet or respectively needle moves back and forth both during a leftward and during a rightward rotary movement. This eliminates the need to move the lancet or respectively needle again when a biasing process takes place so as to bias the drive element again for a new piercing process.

The rotary element is advantageously in the form of a disc-like element, having an axis of rotation arranged perpendicular to the plane of the disc and to the direction of movement of the needle holding element, and the two projections are arranged at the edges of flexibly formed tongue-like elements of the disc plane, the tongue-like elements being deflected in the direction of the path of the axis of rotation. As a result, because of the deflection of one of the two tongue-like elements, the projection arranged thereon can be deflected with respect to the engagement arm associated therewith, whilst the other engagement arm engages in the projection and thus carries out the actual piercing process.

A first portion of the curved path is arranged below a first tongue-like element and a second portion is arranged below a second tongue-like element at an inclination to the disc-like element. A ramp-like formation of this type of the curve path provokes that one projection can be lowered, specifically by means of the inherent bias of the tongue-like element or by means of a pin-like element which is arranged below the tongue-like element and in a path which encloses the pin and which captures the ramp-like curved path in the extension thereof and engages around the pin and pulls it downwards.